MATHS

BOOKS - SURA MATHS (TAMIL ENGLISH)

SET LANGUAGE

Exercise 1 1

1. Which of the following are sets?

The Collection of prime numbers upto 100.

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2. Which of the following are sets?

The Collection of rich people in India.

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3. Which of the following are sets?

The Collection of all rivers in India.

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4. Which of the following are sets?

The Collection of good Hockey players.

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5. List the set of letters of the following words in Roster form.

(i) INDIA

(ii) PARALLELOGRAM

(iii) MISSISSIPPI

(iv) CZECHOSLOVAKIA

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6. Consider the following sets A = {0, 3, 5, 8} B = {2, 4, 6, 10} C = {12, 14, 18, 20}

(a) State whether True or false.

(i) $18 \in C$

(ii) $6 \notin A$

(iii) $14 \notin C$

(iv) $10 \in B$

(v) $5 \in B$

(vi) $0 \in B$

(b) Fill in the blanks?

(i) $3 \in$ _____

(ii) $14 \in$ _____

(iii) 18 _____ B

(iv) 4 ____ B

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7. Represent the following sets in Roster form.

A = The set of all even natural numbers less than 20.

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8. Represent the following sets in Roster form.

B = $\left\{y : y = \frac{1}{2n}, n \in N, n \leq 5\right\}$

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9. Represent the following sets in Roster form.

C = {x : x is perfect cube, $27 < x < 216$}

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10. Represent the following sets in Roster form.

D = $\{x : x \in \mathbb{Z}, -5 < x \leq 2\}$

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11. Represent the following sets in set builder form.

B = The set of all Cricket players in India who scored double centuries in One Day Internationals.

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12. Represent the following sets in set builder form.

C = $\left\{\frac{1}{2}, \frac{2}{3}, \frac{3}{4} \ldots\right\}$.

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13. Represent the following sets in set builder form.

D = The set of all tamil months in a year.

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14. Represent the following sets in set builder form.

E = The set of odd Whole numbers less than 9.

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15. Represent The following sets in descriptive form.

P = {January, June, July}

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16. Represent The following sets in descriptive form.

Q = {7, 11, 13, 17, 19, 23, 29}

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17. Represent The following sets in descriptive form.

R = $\{x : x \in \mathbb{N}, x < 5\}$

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18. Represent The following sets in descriptive form.

S = {x : x is a consonant in English alphabets}

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19. Let A = {0, 1, 2, 3, 4, 5}. Insert appropriate symbol $\in$ or $\notin$ in the blank spaces.

0 _____ A

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20. Let A = {0, 1, 2, 3, 4, 5}. Insert appropriate symbol $\in$ or $\notin$ in the blank spaces.

6 ____ A

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21. Let A = {0, 1, 2, 3, 4, 5}. Insert appropriate symbol $\in$ or $\notin$ in the blank spaces.

3 _____ A

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22. Let A = {0, 1, 2, 3, 4, 5}. Insert appropriate symbol $\in$ or $\notin$ in the blank spaces.

4 _____ A

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23. Let A = {0, 1, 2, 3, 4, 5}. Insert appropriate symbol $\in$ or $\notin$ in the blank spaces.

7 _____ A

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24. Write the following in Set-Builder form.

The set of all positive even numbers.

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25. Write the following in Set-Builder form.

The set of all whole numbers less than 20.

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26. Write the following in Set-Builder form.

The set of all positive integers which are multiple of 3.

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27. Write the following in Set-Builder form.

The set of all odd natural number less than 15.

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28. Write the following in Set-Builder form.

The set of all letters in the word 'computer'.

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29. Write the following sets in Roster form.

$A = \{x : x \in \mathbb{N}, 2 < x < 10\}$

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30. Write the following sets in Roster form.

$B = \left\{x : x \in \mathbb{Z}, -\frac{1}{2} < x < \frac{11}{2}\right\}$

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31. Write the following sets in Roster form.

C = {x : x is a prime number and a divisor of 6 }

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32. Write the following sets in Roster form.

$x = \{x : x = 2^n, n \in \mathbb{N} \text{ and } n \leq 5\}$

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33. Write the following sets in Roster form.

$M = \{x : x = 2y - 1, y \leq 5, y \in W\}$

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Exercise 1 2

1. Find the cardinal number of the following sets.

M = {p, q, r, s, t, u}

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2. Find the cardinal number of the following sets.

P = $\{x : x = 3n + 2, n \in W \text{ and } x < 15\}$

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3. Find the cardinal number of the following sets.

Q = $\left\{y : y = \frac{4}{3n}, n \in \mathbb{N} \text{ and } 2 < n \leq 5\right\}$

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4. Find the cardinal number of the following sets.

R = {x : x is an integers, $x \in \mathbb{Z}$ and $-5 \leq x < 5$}

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5. Find the cardinal number of the following sets.

S = The set of all leap years between 1882 and 1906.

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6. Identify the following sets as finite or infinite.

X = The set of all districts in Tamilnadu.

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7. Identify the following sets as finite or infinite.

Y = The set of all straight lines passing through a point.

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8. Identify the following sets as finite or infinite.

A = $\{x : x \in \mathbb{Z} \text{ and } x < 5\}$

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9. Identify the following sets as finite or infinite.

B = $\{x : x^2 - 5x + 6 = 0, x \in \mathbb{N}\}$

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10. Which of the following sets are equivalent or unequal or equal sets?

A = The set of vowels in the English alphabets.

B = The set of all leters in the word "VOWEL"

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11. Which of the following sets are equivalent or unequal or equal sets?

C = {2, 3, 4, 5}

D = $\{x : x \in W, 1 < x < 5\}$

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12. Which of the following sets are equivalent or unequal or equal sets?

E = A = {x : x is a letter in the word "LIFE"}

F = {F, I, L, E}

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13. Which of the following sets are equivalent or unequal or equal sets?

X = {x : x is a prime number and $3 < x < 23$}

Y = {x : x is a divisor of 18}

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14. Identify the following sets as null set or singleton set.

A = $\{x : x \in \mathbb{N}, 1 < x < 2\}$

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15. Identify the following sets as null set or singleton set.

B = The set of all even natural numbers which are not divisible by 2.

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16. Identify the following sets as null set or singleton set.

C = {0}.

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17. Identify the following sets as null set or singleton set.

D = The set of all triangles having four sides.

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18. State which pairs of sets are disjoint or overlapping?

A = $\{f, i, a, s\}$ and B = {a,n,f,h,s}

Watch Video Solution

19. State which pairs of sets are disjoint or overlapping?

C = {x : x is a prime number, $x > 2$} and D = {x : x is an even prime number}

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20. State which pairs of sets are disjoint or overlapping?

E = {x : x is a factor of 24} and F = {x : x is a multiple of 3, $x < 30$}

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21. If S = {square, rectangle, circle, rhombus, triangle}, list the elements of the following subset of S.

The set of shapes which have 4 equal sides.

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22. If S = {square, rectangle, circle, rhombus, triangle}, list the elements of the following subset of S.

The set of shapes which have radius.

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23. If S = {square, rectangle, circle, rhombus, triangle}, list the elements of the following subset of S.

The set of shapes in which the sum of all interior angles is 180°

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24. If S = {square, rectangle, circle, rhombus, triangle}, list the elements of the following subset of S.

The set of shapes which have 5 sides.

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25. If A = {a,{a,b}}, write all the subsets of A.

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26. Write down the power set of the following sets.

A = {a,b}

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27. Write down the power set of the following sets.

B = {1,2,3}

Watch Video Solution

28. Write down the power set of the following sets.

D = {p,q,r,s}

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29. Write down the power set of the following sets.

E = Ø

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30. Find the number of subsets and the number of proper subsets of the following sets.

W = {red, blue, yellow}

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31. Find the number of subsets and the number of proper subsets of the following sets.

$X = \{x^2 : x \in \mathbb{N}, x^2 \leq 100\}$.

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32. If n(A) = 4, find n[P(A)].

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33. If n(A) = 0, find n[P(A)].

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34. If n[P(A)] = 256, find n(A).

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35. Find the number of subsets and number of proper subsets of a set $X = \{a, b, c, x, y, z\}$.

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36. Find the cardinal number of the following sets.

A = {x : x is a prime factor of 12}.

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37. Find the cardinal number of the following sets.

$B = \{x : x \in W, x \leq 5\}$.

Watch Video Solution

38. Find the cardinal number of the following sets.

X = {x : x is an even prime number}.

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39. State whether the following sets are finite or infinite.

A = {x : x is a multiple of 5, $x \in N$}.

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40. State whether the following sets are finite or infinite.

B = {0, 1, 2, 3, 4, ... 75}.

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41. State whether the following sets are finite or infinite.

The set of all positive integers greater than 50.

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42. Which of the following sets are equal?

A = {1, 2, 3, 4}, B = {4, 3, 2, 1}

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43. Which of the following sets are equal?

A = {4, 8, 12, 16}, B = {8, 4, 16, 18}

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44. Which of the following sets are equal?

X = {2, 4, 6, 8}

Y = {x : x is a posiitive even integer and $0 < x < 10$}

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45. Write $\subseteq$ or $\not\subseteq$ in each blank to make a true statement.

{4, 5, 6, 7} _____ {4, 5, 6, 7, 8}

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46. Write $\subseteq$ or $\not\subseteq$ in each blank to make a true statement.

{a, b, c} _____ {b, e, f, g}

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47. Write down the power set of A = {3, {4, 5}}.

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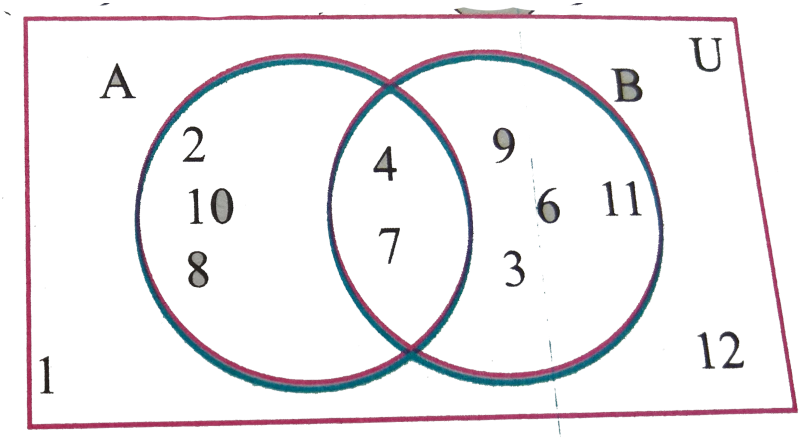
Exercise 1 3

1. Using the given venn diagram, write the elements of



(i) A

(ii) B

(iii) $A \cup B$

(iv) $A \cap B$

(v) A - B

(vi) B - A

(vii) A'

(viii) B'

(ix) U

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2. Find $A \cup B$, $A \cap B$, $A - B$ and $B - A$ for the following sets.

A = {2, 6, 10, 14} and B = {2, 5, 14, 16}

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3. Find $A \cup B$, $A \cap B$, $A - B$ and $B - A$ for the following sets.

A = {a, b, c, e, u} and B = {a, e, i, o, u}

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4. Find $A \cup B$, $A \cap B$, $A - B$ and $B - A$ for the following sets.

$A = \{x : x \in \mathbb{N}, x \leq 10\}$ and $B = \{x : x \in W, x < 6\}$

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5. Find $A \cup B$, $A \cap B$, $A - B$ and $B - A$ for the following sets.

A = set of all letters in the word "mathematics" and

B = Set of all letters in the word "geometry"

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6. If U = {a, b, c, d, e, f, g, h}, A = {b, d, f, h} and B = {a, d, e, h}, find the following sets.

A'

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7. If U = {a, b, c, d, e, f, g, h}, A = {b, d, f, h} and B = {a, d, e, h}, find the following sets.

B'

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8. If U = {a, b, c, d, e, f, g, h}, A = {b, d, f, h} and B = {a, d, e, h}, find the following sets.

$A' \cup B'$

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9. If U = {a, b, c, d, e, f, g, h}, A = {b, d, f, h} and B = {a, d, e, h}, find the following sets.

$A' \cap B'$

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10. If U = {a, b, c, d, e, f, g, h}, A = {b, d, f, h} and B = {a, d, e, h}, find the following sets.

$(A \cup B)'$

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11. If U = {a, b, c, d, e, f, g, h}, A = {b, d, f, h} and B = {a, d, e, h}, find the following sets.

$(A \cap B)'$

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12. If U = {a, b, c, d, e, f, g, h}, A = {b, d, f, h} and B = {a, d, e, h}, find the following sets.

(A')'

Watch Video Solution

13. If U = {a, b, c, d, e, f, g, h}, A = {b, d, f, h} and B = {a, d, e, h}, find the following sets.

(B')'

Watch Video Solution

14. Let U = {0, 1, 2, 3, 4, 5, 6, 7}, A = {1, 3, 5, 7} and B = {0, 2, 3, 5, 7}, find the following sets.

A'

Watch Video Solution

15. Let U = {0, 1, 2, 3, 4, 5, 6, 7}, A = {1, 3, 5, 7} and B = {0, 2, 3, 5, 7}, find the following sets.

B'

Watch Video Solution

16. Let U = {0, 1, 2, 3, 4, 5, 6, 7}, A = {1, 3, 5, 7} and B = {0, 2, 3, 5, 7}, find the following sets.

$A' \cup B'$

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17. Let U = {0, 1, 2, 3, 4, 5, 6, 7}, A = {1, 3, 5, 7} and B = {0, 2, 3, 5, 7}, find the following sets.

$A' \cap B'$

Watch Video Solution

18. Let U = {0, 1, 2, 3, 4, 5, 6, 7}, A = {1, 3, 5, 7} and B = {0, 2, 3, 5, 7}, find the following sets.

$(A \cup B)'$

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19. Let U = {0, 1, 2, 3, 4, 5, 6, 7}, A = {1, 3, 5, 7} and B = {0, 2, 3, 5, 7}, find the following sets.

$(A \cap B)'$

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20. Let U = {0, 1, 2, 3, 4, 5, 6, 7}, A = {1, 3, 5, 7} and B = {0, 2, 3, 5, 7}, find the following sets.

(A')'

Watch Video Solution

21. Let U = {0, 1, 2, 3, 4, 5, 6, 7}, A = {1, 3, 5, 7} and B = {0, 2, 3, 5, 7}, find the following sets.

(B')'

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22. Find the symmetric difference between the following sets.

P = {2, 3, 5, 7, 11} and Q = {1, 3, 5, 11}

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23. Find the symmetric difference between the following sets.

R = {l, m, n, o, p} and S = {j, l, n, q}

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24. Find the symmetric difference between the following sets.

X = {5, 6, 7} and Y = {5, 7, 9, 10}

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25. The shaded region in the adjoining diagram represents.

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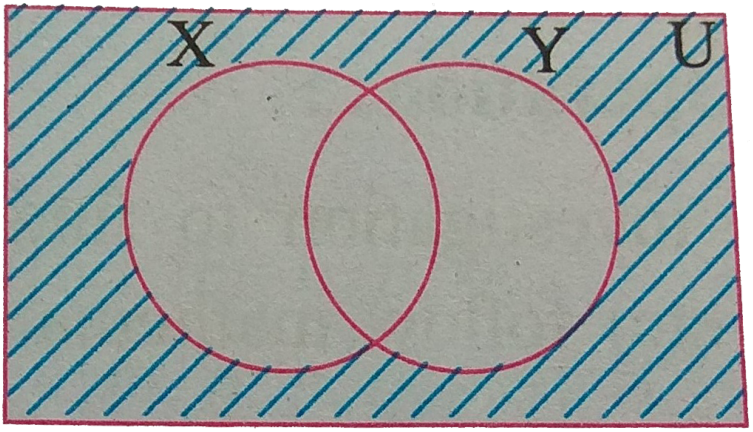
26. Using the set symbols, write down the expressions for the shaded region in the following



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27. The shaded region in the adjoining diagram represents.

Watch Video Solution

28. Let A and B be two overlapping sets and the universal set U. Draw appropriate Venn diagram for each of the following,

(i) $A \cup B$

(ii) $A \cap B$

(iii) $(A \cap B)'$

(iv) (B - A)'

(v) $A' \cup B'$

(vi) $A' \cap B'$

(vii) What do you observe from the diagram (iii) and (v)?

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29. Find the union of the following sets.

A = {1, 2, 3, 5, 6} and B = {4, 5, 6, 7, 8}

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30. Find the union of the following sets.

X = {3, 4, 5) and Y = Ø

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31. Find $A \cap B$ if

A = {10, 11, 12, 13}, B = {12, 13, 14, 15}

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32. Find $A \cap B$ if

A = {5, 9, 11}, B = Ø.

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33. Given the sets A = {4, 5, 6, 7} and B = {1, 3, 8, 9}, find $A \cap B$.

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34. If A = {-2, -1, 0, 3, 4}, B = {-1, 3, 5}, find

A - B.

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35. If A = {-2, -1, 0, 3, 4}, B = {-1, 3, 5}, find

B - A.

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36. If A = {2, 3, 5, 7, 11} and B = {5, 7, 9, 11, 13}, find $A \Delta B$.

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37. Draw a venn diagram similar to one at the side and shade the regions resresenting the following sets

A'

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38. Draw a venn diagram similar to one at the side and shade the regions resresenting the following sets

B'

Watch Video Solution

39. Draw a venn diagram similar to one at the side and shade the regions resresenting the following sets

$A' \cup B'$

Watch Video Solution

40. Draw a venn diagram similar to one at the side and shade the regions resresenting the following sets

$(A \cup B)'$

Watch Video Solution

41. Draw a venn diagram similar to one at the side and shade the regions resresenting the following sets

$A' \cap B'$

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42. State which of the following sets are disjoint.

A = {2, 4, 6, 8}, B = {x : x is an even number $< 10, x \in N$}

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43. State which of the following sets are disjoint.

X = {1, 3, 5, 7, 9}, Y = {0, 2, 4, 6, 8, 10}

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44. State which of the following sets are disjoint.

R = {a, b, c, d, e}, S = {d, e, b, c, a}

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45. If A = {a, b, c, d, e} and B = {a, e, i, o, u} find AB.

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Exercise 1 4

1. If P = {1, 2, 5, 7, 9}, Q = {2, 3, 5, 9, 11}, R = {3, 4, 5, 7, 9} and S = {2, 3, 4, 5, 8}, then find

$(P \cup Q) \cup R$

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2. If P = {1, 2, 5, 7, 9}, Q = {2, 3, 5, 9, 11}, R = {3, 4, 5, 7, 9} and S = {2, 3, 4, 5, 8}, then find

$(P \cap Q) \cap S$

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3. If P = {1, 2, 5, 7, 9}, Q = {2, 3, 5, 9, 11}, R = {3, 4, 5, 7, 9} and S = {2, 3, 4, 5, 8}, then find

$(Q \cap S) \cap R$

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4. Test for the commutative property of union and intersection of the sets

P = {x : x is a real number between 2 and 7} and

Q = {x : x is an irrational number between 2 and 7}

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5. If A = {p, q, r, s}, B = {m, n, q, s, t} and C = {m, n, p, q, s}, then verify the associative property of union of sets.

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6. Verify the associative property of intersection of sets for $A = \{-11, \sqrt{2}, \sqrt{5}, 7\}, B = \{\sqrt{3}, \sqrt{5}, 6, 13\}$ and $C = \{\sqrt{2}, \sqrt{3}, \sqrt{5}, 9\}$

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7. If $A = \{x : x = 2^n, n \in W \text{ and } n < 4\}, B = \{x : x = 2n, n \in \mathbb{N} \text{ and } \leq 4\}$ and C = {0, 1, 2, 5, 6}, then verify the associative property of intersection of sets.

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8. If A and B are two sets containing 13 and 16 elements respectively, then find the minimum and maximum number of elements in $A \cup B$?

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9. If $n(U) = 38, n(A) = 16, n(A \cap B) = 12, n(B') = 20$, find $n(A \cup B)$.

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10. Let A = {b, d, e, g, h} and B = {a, e, c, h} verify that $n(A-B)=n(A)-n(A\cap B)$

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11. If A = {2, 5, 6, 7} and B = {3, 5, 7, 8}, then verify the commutative property of

(i) union of sets

(ii) intersection of sets

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12. If A = {b, c, d, e} and B = {b, c, e, g} and C = {a, c, e}, then verify $A\cup(B\cup C)=(A\cup B)\cup C.$

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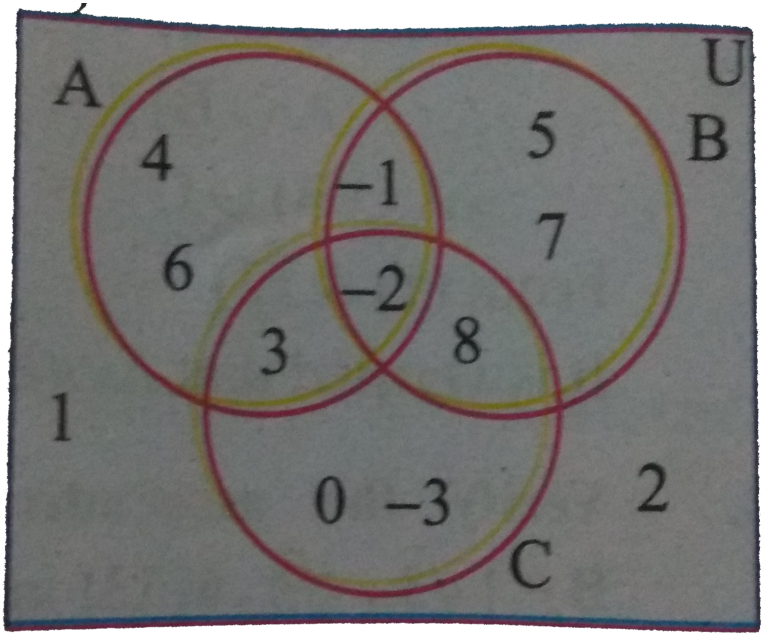
Exercise 1 5

1. Using the adjacent venn diagram, find the following sets :



(i) A - B

(ii) B - C

(iii) $A' \cup B'$

(iv) $A' \cap B'$

(v) $(B \cup C)'$

(vi) $A - (B \cup C)$

(vii) $A - (B \cap C)$

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2. If K = {a, b, d, e, f}, L = {b, c, d, g} and M = (a, b, c, d, h} then find the following:

$K \cup (L \cap M)$ and verify distributive laws.

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3. If K = {a, b, d, e, f}, L = {b, c, d, g} and M = (a, b, c, d, h} then find the following:

$K \cap (L \cup M)$ and verify distributive laws.

Watch Video Solution

4. If K = {a, b, d, e, f}, L = {b, c, d, g} and M = (a, b, c, d, h} then find the following:

$(K \cup L) \cap (K \cup M)$ and verify distributive laws.

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5. If K = {a, b, d, e, f}, L = {b, c, d, g} and M = (a, b, c, d, h} then find the following:

$(K \cap L) \cup (K \cap M)$ and verify distributive laws.

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6. If $A = \{x : x \in \mathbb{Z}, \ -2 < x \leq 4\}$, $B = \{x : x \in W, x \leq 5\}$, C = {-4, -1, 0, 2, 3, 4}, then verify $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$.

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7. Verify $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ using Venn diagrams.

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8. If A = {b, c, e, g, h}, B = {a, c, d, g, i} and C = {a, d, e, g, h}, then show that $A - (B \cap C) = (A - B) \cup (A - C)$.

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9. If

$A = \{x : x = 6n, n \in W \text{ and } n < 6\}, B = \{x : x = 2n, n \in \mathbb{N} \text{ and } 2 < n$

, then show that $A - (B \cap C) = (A - B) \cup (A - C)$

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10. If A = {-2, 0, 1, 3, 5}, B = {-1, 0, 2, 5, 6} and C = {-1, 2, 5, 6, 7}, then show that

$A - (B \cup C) = (A - B) \cap (A - C).$

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11. If

$A = \left\{y : y = \frac{a+1}{2}, a \in W \text{ and } a \leq 5\right\}, B = \left\{y : y = \frac{2n-1}{2}, n \in W\right.$

, then show that $A - (B \cup C) = (A - B) \cap (A - C).$

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12. Verify $A - (B \cap C) = (A - B) \cup (A - C)$ using Venn diagrams.

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13. If U = {4, 7, 8, 10, 11, 12, 15, 16}, A = {7, 8, 11, 12} and B = {4, 8, 12, 15}, then verify De Morgan's Laws for complementation.

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14. Verify $(A \cap B)' = A' \cup B'$ using Venn diagrams.

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15. If A = {1, 3, 5, 7, 9}, B = {x : x is a composite number and $x < 12$} and C = $\{x : x \in N \text{ and } 6 < x < 10\}$ then verify $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$.

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16. If A, B and C are overlapping sets, draw venn diagram for : $A \cap B$

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17. Draw Venn diagram for $A \cap B \cap C$

Watch Video Solution

18. If P = $\{x : x \in \mathbb{N} \text{ and } 1 < x < 11\}, Q = \{x : x = 2n, n \in \mathbb{N} \text{ and } n < 6\}$ and R = {4, 6, 8, 9, 10, 12}, then verify $P - (Q \cap R) = (P - Q) \cup (P - R)$.

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19. If $U = \{x : x \in \mathbb{Z}, -3 \leq x \leq 9\}, A = \{x : x = 2P + 1, P \in \mathbb{Z}, -2 \leq P \leq$

, verify De Morgan's laws for complementation.

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Exercise 1 6

1. If n(A) = 25, n(B) = 40, $n(A \cup B) = 50$ and n(B') = 25, find $n(A \cap B)$ and n(U).

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2. If n(A) = 300, $n(A \cup B) = 500$, $n(A \cap B) = 50$ and n(B') = 350, find n(B) and n(U).

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3. If $U = \{x : x \in \mathbb{N}, x \leq 10\}$, A = {2, 3, 4, 8, 10} and B = {1, 2, 5, 8, 10}, then verify that $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

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4. Verify

$n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(A \cap$

for the following sets.

(i) A{a, c, e, f, h}, B = {c, d, e, f} and C = {a, b, c, f}

(ii) A = {1, 3, 5} B = {2, 3, 5, 6} and C = {1, 5, 6, 7}.

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5. In a class, all students take part in either music or drama or both. 25 students take part in music, 30 students take part in drama and 8 students take part in both music and drama. Find

(i) The number of students who take part in only music.

(ii) The number of students who take part in only drama.

(iii) The total number of students in the class.

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6. In a party of 45 people, each one likes tea or coffee or both. 35 people like tea and 20 people like coffee. Find the number of people who

(i) like both tea and coffee.

(ii) do not like tea.

(iii) do not like coffee.

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7. In an examination 50% of the students passed in Mathematics and 70% of students passed in Science while 10% students failed in both subjects. 300 students passed in atleast one subjects. Find the total number of students who appeared in the examination, if they took examination in only two subjects.

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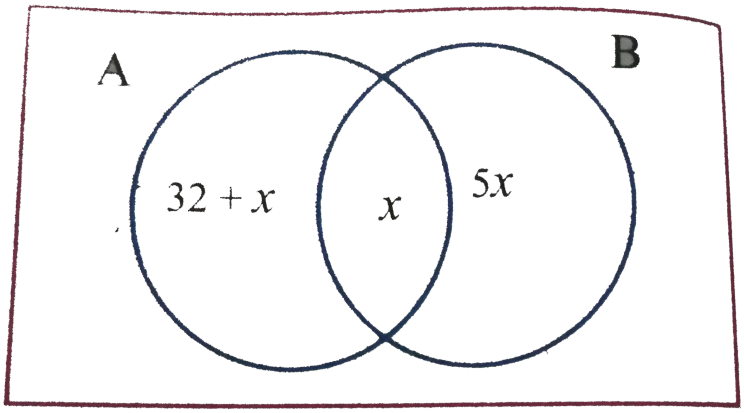
8. A and B are two sets such that n(A - B) = 32 + x, n(B - A) = 5x and $n(A \cap B) = x$. Illustrate the information by means of a venn diagram.

Given that n(A) = n(B), calculate the value of x.



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9. Out of 500 car owners investigated, 400 owned car A and 200 owned car B, 50 owned both A and B cars. Is this data correct?

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10. In a colony, 275 families buy Tamil newspaper, 150 families buy English newspaper, 45 families buy Hindi newspaper, 125 families buy Tamil and English newspapers, 17 families buy English and Hindi newspapers, 5

families buy Tamil and Hindi newspapers and 3 families buy all the three newspapers. If each family buy atleast one of these newspapers then find

(i) Number of families buy only one newspaper

(ii) Number of families buy atleast two newspapers

(iii) Total number of families in the colony.

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11. A survey of 1000 farmers found that 600 grew paddy, 350 grew ragi, 280 grew corn, 120 grew paddy and ragi, 100 grew ragi and corn, 80 grew paddy and corn. If each farmer grew atleast any one of the above three, then find the number of farmers who grew all the three.

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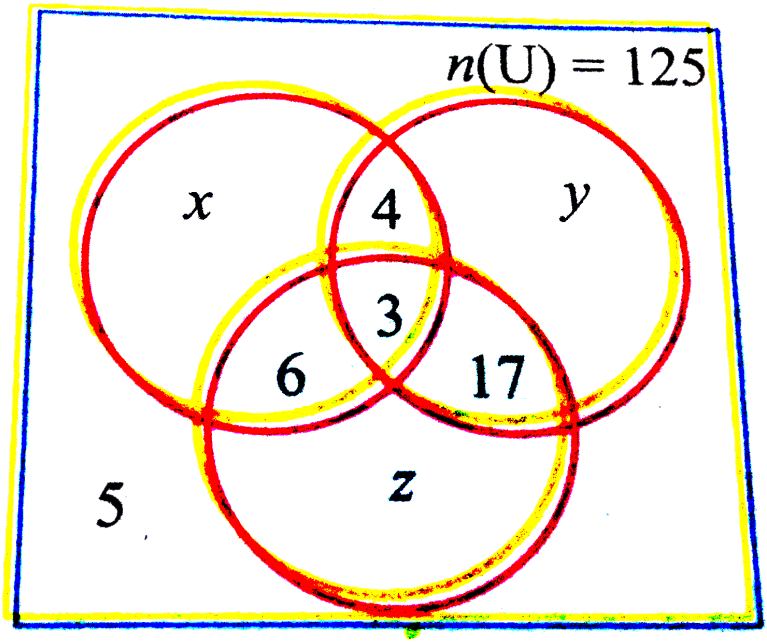
12. In the adjacent diagram, if n(U) = 125, y is two times of x and z is 10 more than x, then find the value of x, y and z.



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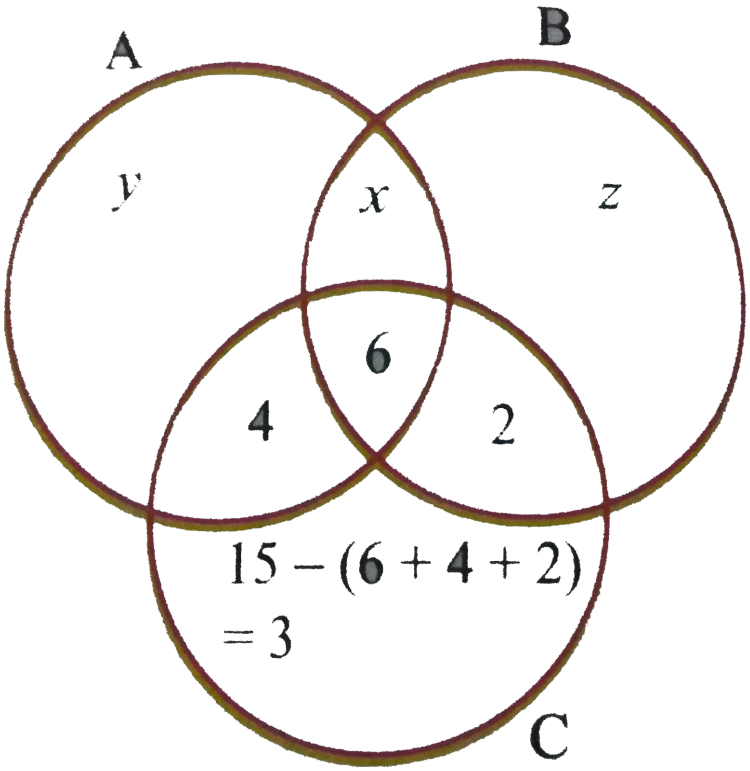
13. Each student in a class of 35 plays atleast one game among chess, carrom and table tennis. 22 play chess, 21 play carrom, 15 play table tennis, 10 play chess and table tennis, 8 play carrom and table tennis and 6 play all the three games. Find the number of students who play (i) chess and carrom but not table tennis (ii) only chess (iii) only carrom (Hint: Use

Venn diagram)



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14. In a class of 50 students, each one come to school by bus or by bicycle or on foot. 25 by bus, 20 by bicycle, 30 on foot and 10 students by all the three. Now how many students come to school exactly by two modes of transport?

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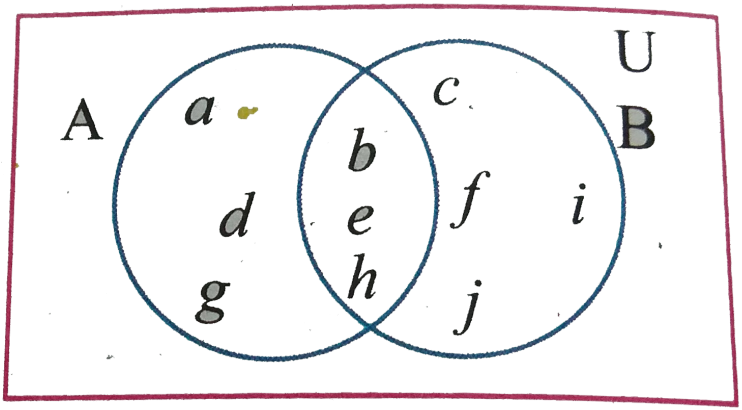
15. From the given venn diagram. Find (i) A, (ii) B, (iii) $A \cup B$, (iv) $A \cap B$ also verify that $n(A \cup B) = n(A) + n(B) - n(A \cap B)$



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16. If n(A) = 12, n(B) = 17 and $n(A \cup B) = 21$ find $n(A \cap B)$.

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17. In a school, 80 students like Maths, 90 students like Science, 82 students like History, 21 like both Maths and Science, 19 like both Science and History 20 like both Maths and History and 8 liked all the three subjects. If each student like atleast one subject, then find (i) the number of students in the school (ii) the number of students who like only one subject.

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18. State the formula to find $n(A \cup B \cup C)$.

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19. Verify

$n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(A \cap$

for the following sets A = {1, 3, 5, 6, 8}, B = {3, 4, 5, 6) and C = {1, 2, 3, 6}

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Exercise 1 7

1. Which of the following is correct?

A. $\{7\} \in \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

B. $7 \in \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

C. $7 \notin \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

D. $\{7\} \not\subseteq \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

Answer:

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2. The set $P = \{x \mid x \in \mathbb{Z}, \ -1 < x < 1\}$ is a

A. Singleton set

B. Power set

C. Null set

D. Subset

Answer:

Watch Video Solution

3. If $U = \{x \mid x \in \mathbb{N}, x < 10\}$ and $A = \{x \mid x \in \mathbb{N}, 2 \leq x < 6\}$ then (A')' is

A. {1,6,7,8,9}

B. {1,2,3,4}

C. {2,3,4,5}

D. { }

Answer:

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4. If $B \subseteq A$ then $n(A \cap B)$ is

A. n(A - B)

B. n(B)

C. n(B - A)

D. n(A)

Answer:

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5. If A = {x,y,z} then the number of non-empty subsets of A is

A. 8

B. 5

C. 6

D. 7

Answer:

Watch Video Solution

6. Which of the following is a correct statement?

A. $\emptyset \subseteq \{a, b\}$

B. $\emptyset \in \{a, b\}$

C. $\{a\} \in \{a, b\}$

D. $a \subseteq \{a, b\}$

Answer:

Watch Video Solution

7. If $A \cup B = A \cap B$ then

A. $A \neq B$

B. A = B

C. $A \subset B$

D. $B \subset A$

Answer:

Watch Video Solution

8. If B - A is B, then $A \cap B$ is

A. A

B. B

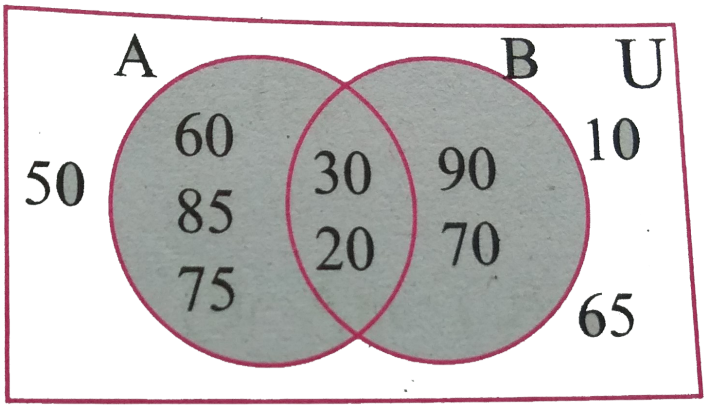
C. U

D. $\emptyset$

Answer:

Watch Video Solution

9. From the adjacent diagram $n[P(A\Delta B)]$ is



A. 8

B. 16

C. 32

D. 64

Answer:

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10. If $n(A) = 10$ and $n(B) = 15$ then the minimum and maximum number of elements in $A \cap B$ is

A. (10,15)

B. (15,10)

C. (10,0)

D. (0,10)

Answer:

Watch Video Solution

11. Let A = {Ø} and B = P(A) then $A \cap B$ is

A. { Ø, {Ø} }

B. {Ø}

C. Ø

D. {0}

Answer:

Watch Video Solution

12. In a class of 50 boys, 35 boys play carom and 20 boys play chess then the number of boys play both games is

A. 5

B. 30

C. 15

D. 10

Answer:

Watch Video Solution

13. If $U = \{x : x \in \mathbb{N} \text{ and } x < 10\}$, A = {1, 2, 3, 5, 8} and B = {2, 5, 6, 7, 9}, then $n[(A \cup B)']$ is

A. 1

B. 2

C. 4

D. 8

Answer:

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14. For any three sets P, Q and R, $P - (Q \cap R)$ is

A. $P - (Q \cup R)$

B. $(P \cap Q) - R$

C. $(P - Q) \cup (P - R)$

D. $(P - Q) \cap (P - R)$

Answer:

Watch Video Solution

15. Which of the following is true?

A. $A - B = A \cap B$

B. A - B = B - A

C. $(A \cup B)' = A' \cup B'$

D. $(A \cap B)' = A' \cup B'$

Answer:

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16. If $n(A \cup B \cup C) = 100, n(A) = 4x, n(B) = 6x, n(C) = 5x, n(A \cap B) = 20$ and $n(A \cap B \cap C) = 10$ then the value of x is .

A. 10

B. 15

C. 25

D. 30

Answer:

Watch Video Solution

17. For any three sets A, B and C, $(A - B) \cap (B - C)$ is equal to

A. A only

B. B only

C. C only

D. ϕ

Answer:

Watch Video Solution

18. If J = Set of three sided shapes, K = Set of shapes with two equal sides and L = Set of shapes with right angle, then $J \cap K \cap L$ is

A. Set of isoceles triangles

B. Set of equilateral triangles

C. Set of isoceles right triangles

D. Set of right angled triangles

Answer:

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19. The shaded region in the Venn diagram is

A. $Z - (X \cup Y)$

B. $(X \cup Y) \cap Z$

C. $Z - (X \cap Y)$

D. $Z \cup (X \cap Y)$

Answer:

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20. In a city, 40% people like only one fruit, 35% people like only two fruits, 20% people like all three fruits. How many percentage of people do not like any one of the above three fruits?

A. 5

B. 8

C. 10

D. 15

Answer:

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21. If A = {5, {5, 6}, 7} which of the following is correct?

A. $\{5, 6\} \in A$

B. $\{5\} \in A$

C. $\{7\} \in A$

D. $\{6\} \in A$

Answer:

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22. If X = {a, {b, c}, d}, which of the following is a subset of X?

A. {a, b}

B. {b, c}

C. {c, d}

D. {a, d}

Answer:

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23. If a finite set A has m elements, then the number of non-empty proper subset of A is

A. 2^m

B. $2^m - 1$

C. 2^{m-1}

D. $2\left(2^{m-1} - 1\right)$

Answer:

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24. For any three A, B and C, $A - (B \cup C)$ is

A. $(A - B) \cup (A - C)$

B. $(A - B) \cap (A \cup C)$

C. $(A - B) \cup C$

D. $A \cup (B - C)$

Answer:

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25. Which of the following is true?

A. $(A \cup B) = B \cup A$

B. $(A \cup B)' = A' - B'$

C. $(A \cap B)' = A' \cap B'$

D. $A - (B \cap C) = (A - B) \cap (A - C)$

Answer:

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26. The shaded region in the venn diagram is

A. $A \cup B$

B. $A \cap B$

C. $(A \cap B)'$

D. $(A - B) \cup (B - A)$

Answer:

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Text Book Activities

1. Discuss and give as many examples of collections from your daily life situations, which are sets and which are not sets.

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2. Write the following sets in respective forms.

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Unit Test

1. The set $P = \{x \mid x \in \mathbb{Z},\ -1 < x < 1\}$ is a

A. Singleton set

B. Power set

C. Null set

D. Subset

Answer:

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2. Which of the following is correct?

A. $\{7\} \in \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

B. $7 \in \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

C. $7 \notin \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

D. $\{7\} \notin \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

Answer:

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3. Which of the following is a correct statement?

A. $\text{Ø}(\ \subseteq\ )\{a, b\}$

B. $\text{Ø} \in \{a, b\}$

C. $\{a\} \in \{a, b\}$

D. $a \subseteq \{a, b\}$

Answer:

Watch Video Solution

4. For any three sets A, B and C, $(A - B) \cap (B - C)$ is equal to

A. A only

B. B only

C. C only

D. ϕ

Answer:

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5. Represent the following sets in set builder form.

B = The set of all Cricket players in India who scored double centuries in One Day Internationals.

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6. Which of the following sets are equivalent or unequal or equal sets?

A = The set of vowels in the English alphabets.

B = The set of all leters in the word "VOWEL"

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7. Which of the following sets are equivalent or unequal or equal sets?

C = {2, 3, 4, 5}

D = $\{x : x \in W, 1 < x < 5\}$

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8. Write down the power set of the following sets.

A = {a,b}

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9. Write down the power set of the following sets.

B = {1,2,3}

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10. If $U = \{x : x \in \mathbb{N}, x \leq 10\}$, A = {2, 3, 4, 8, 10} and B = {1, 2, 5, 8, 10}, then verify that $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

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11. Write the following sets in Roster form.

C = {x : x is a prime number and a divisor of 6 }

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12. Write the following sets in Roster form.

$x = \{x : x = 2^n, n \in \mathbb{N} \text{ and } n \leq 5\}$

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13. Which of the following sets are equivalent?

A = {2, 4, 6, 8, 10}, B = {1, 3, 5, 7, 9}

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14. Which of the following sets are equivalent?

$X = \{x : x \in \mathbb{N}, 1 < x < 6\}$, Y = {x : x is a vowel in the English Alphabet}

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15. If A = {-2, -1, 0, 3, 4}, B = {-1, 3, 5}, find

A - B.

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16. If A = {-2, -1, 0, 3, 4}, B = {-1, 3, 5}, find

B - A.

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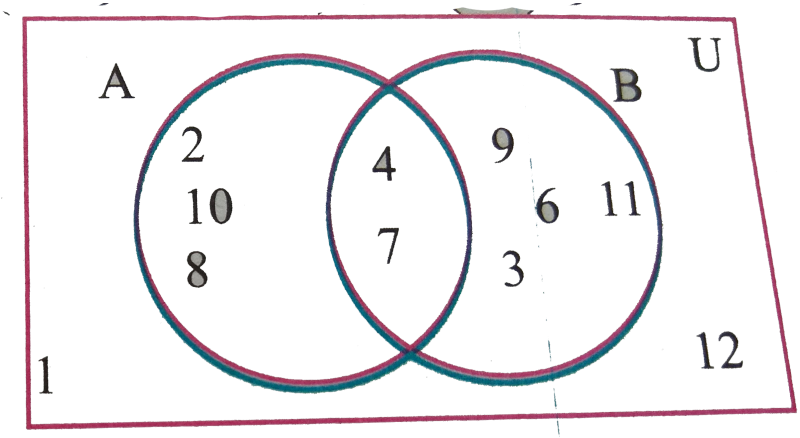
17. Using the given venn diagram, write the elements of



(i) A

(ii) B

(iii) $A \cup B$

(iv) $A \cap B$

(v) A - B

(vi) B - A

(vii) A'

(viii) B'

(ix) U

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18. Let A and B be two overlapping sets and the universal set U. Draw appropriate Venn diagram for each of the following,

(i) $A \cup B$

(ii) $A \cap B$

(iii) $(A \cap B)'$

(iv) (B - A)'

(v) $A' \cup B'$

(vi) $A' \cap B'$

(vii) What do you observe from the diagram (iii) and (v)?

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19. In an examination 50% of the students passed in Mathematics and 70% of students passed in Science while 10% students failed in both subjects. 300 students passed in atleast one subjects. Find the total number of students who appeared in the examination, if they took examination in only two subjects.

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20. If n(A) = 25, n(B) = 40, $n(A \cup B) = 50$ and n(B') = 25, find $n(A \cap B)$ and n(U).

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